

NOTICE

ESC - Electrical Safety Bulletin No. 7

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Notice No. 0108

GUIDANCE BULLETIN

This Guidance Bulletin will be automatically removed from the Notice web page 60 days from its issued date and will become a permanent attachment to LIG 402-600-01, Electrical Safety Implementation Guide on that date.

Use of Power Strips and Other Programmatic Temporary Wiring Methods to Power & Ground Equipment

Background

While setting up an experiment consisting of multiple pieces of 120 volt electrical equipment with primary power supplied by a PowerTrax 1000 power strip made by EFI, a researcher experienced a minor, non-painful, electrical shock when the case of a pump was contacted with one hand and the unistrut frame of the experiment was contacted with the other hand. It was determined by the group Electrical Safety Officer (ESO) that the metal ground connection on the power strip that the pump was plugged into had fatigued and spread. Thus the pump safety-ground had been broken and the pump was floating relative to ground. Because of a filter network at the input of the pump, which operated as a voltage divider, the actual voltage at the pump case was approximately 50 volts.

Heads Up

The use of power strips, a.k.a. temporary power taps, and other methods of temporary wiring, e.g. extension cords, present hazards when the device to be plugged in is equipped with a grounding conductor but fails to make a continuous connection between the device and a confirmed building ground. Heat and arcs may also be generated due to worn, loose and other poor connections; this is the cause of many electrical fires.

Lessons Learned /Recommended Implementation Considerations

- When ESOs commission or approve electrical equipment, measure the continuity of case to its ground prong before plugging it in.
- Failure to confirm chassis to building ground connection can result in electrical shock. The voltage measurement from chassis or case to the cover mounting screw on the building power receptacle should be zero.
- NRTL Listed equipment and their connections can fatigue with age, especially those not rated for commercial or industrial use.
- When experiencing any electrical shock, suspend the activity and evaluate the hazard. Find out the cause of the shock. Don't ask a coworker if he/she experiences the same shock.
- An alternate check involves using a tension tester to assure that at least 4 oz. tension is maintained by receptacle connections. The Daniel Woodhead Company makes an inexpensive tension tester.

Recommended Roles and Responsibilities

1. Worker responsibilities should include implementing safe work practices, such as inspecting temporary wiring equipment before placing it into service. Inspection should include:
 - Signs of aging (frayed or broken cords, scorched contacts, etc).
 - Assuring that the temporary wiring equipment is rated for its intended use (wet/ dry, indoors/ outdoors, flammable or explosive etc.).
 - Assuring that the load rating of the temporary wiring is not exceeded.
 - Assuring there is a firm connection when plugging equipment into a receptacle outlet or an extension cord.
2. Since electrically unqualified workers may normally assume that NRTL-listed temporary wiring devices can be used without inspection, ESOs or qualified electrical workers should assist their group and division personnel by periodically inspecting such equipment and confirming that a building grounding connection is made through the temporary wiring for any device equipped with 3-wire grounding.

Reference

DOE Electrical Safety Handbook (Chapter 8, Section 8.3 and following)
<http://tis.eh.doe.gov/techstds/standard/hdbk1092/hdbk1092.pdf>

Questions?

Contact: Group ESO
Division ESO
Chief ESO 665-7377 or email to tfogle@lanl.gov



The OIC for this notice is the Electrical Safety Committee (ESC). This notice will automatically become an attachment to LIG 402-600-01, Electrical Safety Implementation Guide in 60 days.